

Mean viability and second-order Hamilton-Jacobi equations

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We introduce the notion of mean viability for controlled stochastic differential equations and establish counterparts of Nagumo's classical viability theorems (necessary and sufficient conditions for mean viability). As an application, we provide a purely probabilistic proof of a comparison principle and of existence for contingent and viscosity solutions of second-order fully nonlinear path-dependent Hamilton-Jacobi-Bellman equations. We do not use compactness and optimal stopping arguments, which are usually employed in the literature on viscosity solutions for second-order path-dependent PDEs.

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